the principles of three-colour photography, including even the present "screen-plate" processes, such as the autochrome, Paget, and others. It was impossible then to carry out these processes satisfactorily, because it was not until 1873 that Vogel discovered the possibility of sensitising plates for colour, and it was still later that gelatine plates were commercially manufactured. M. du Hauron was a pioneer also in motion photography, stereoscopic work, and other matters.

The death occurred on September 27 of Dr. D. Lloyd Roberts at the age of eighty-four years. Dr. Lloyd Roberts was born in 1835 at Stockport, and received his medical education at the old Manchester Royal School of Medicine, and afterwards in the hospitals of London and Paris. In 1857 he obtained the diplomas of M.R.C.S. (Eng.) and L.S.A.; two years later he received the degree of M.D. from the University of St. Andrews, and became F.R.C.P. (Lond.) in 1878. During this period he was appointed honorary physician to St. Mary's Hospital for Women and Children, a post which he retained until his death. In 1902 Dr. Lloyd Roberts was president of the section of obstetrics of the British Medical Association, and he was also a member of numerous other medical societies. He contributed many papers to medical journals, and as early as 1876 published "The Practice of Midwifery," the fourth edition of which was issued in 1896. In other spheres he will be remembered as the editor of Sir Thomas Browne's "Religio Medici," first published in 1892, and for a short pamphlet read in 1914 before the Dante Society of Manchester on "The Scientific Knowledge of Dante."

Many geologists in this country will regret to learn that their old friend, Sven Leonhard Törnquist, the doyen of Swedish geologists, died at Lund on September 6 from hæmorrhage of the brain. Törnquist's work on graptolites is familiar to all who deal with Lower Palæozoic palæontology and stratigraphy, and his writings on the geology of the beautiful Siljan district in Dalecarlia and on the relations of the Leptæna limestone have been a guide to many visitors for more than half a century. Papers were received from him up to the present year, for he still retained vigour of mind and body.

We much regret to announce the death on October 1, at sixty-eight years of age, of Prof. Italo Giglioli, professor of agricultural chemistry in the Royal University of Pisa, Italy. Also of Prof. Yves Delage, professor of zoology at the Sorbonne, Paris, and member of the Academies of Science and Medicine, on October 8, at sixty-six years of age.

The death is announced, on October 4, at sixty-five years of age, of Dr. Max Margules, secretary of the Zentralanstalt für Meteorologie und Geodynamik at Vienna.

Notes.

On Monday, October 11, H.R.H. the Prince of Wales returned from his seven months' tour of the West Indies and our Colonies in the Pacific Ocean. When the Prince set out on March 17 it was intended that he should pay a visit to the Indian Empire, but this has been deferred until next year out of consideration for his health. However, during his long journey he has had an opportunity of seeing some of the diverse lands and peoples which go to make up the British Empire. To the credit of science, it can be put on record that during the whole course of the tour the Prince was never for a day out of touch with London. Telegraphy and "wireless" have made continual communication possible. It is also noteworthy that, in spite of encountering bad weather, the *Renown* kept to her time-table with great accuracy; marine engineers are to be congratulated on this remarkable achievement. The experience which the Prince has gained is invaluable to one who will some day have the task of ruling the Empire. His Majesty the King has voiced this sentiment in a letter which was addressed to the Secretary of State for the Colonies for transmission to the Governors-General and Governors of the Colonies which have been visited. He says: "May such mutual intercourse create fresh ties of confidence and devotion between the Throne and the generations, present and future, of these great lands, and thus promote the unity, strength, and prosperity of the Empire." The experience is also of importance in the study of problems of the moment, of reconstruction and all that it entails. That the Prince himself appreciates this is apparent from the following words from his reply to the address of welcome made by the Mayor of Portsmouth: "We are still, I fear, only at the beginning of the labours which are necessary to restore our credit and prosperity after the prolonged strain of the war, and I am deeply interested in our problems of reconstruction, which all parts of the nation must pull together to solve."

In 1901 the German troops in Peking removed a number of old astronomical instruments from the city wall, and they were sent to Germany and erected at Potsdam. By the Treaty of Peace it was stipulated that they were to be restored. Col. Yate, hon. secretary of the Central Asian Society, announces in the *Times* of October 8 that twenty huge cases containing these instruments have arrived in China. Six of the instruments were constructed in 1673 by Father Verbiest, S.J., and one in 1715 by Father Kegler, S.J., and these are all copies of Tycho Brahe's instruments. To make room for them on top of the wall Verbiest removed thence two old instruments, which afterwards were put up in a court at the foot of the wall, where they stood until 1901. These two instruments had been erected in 1279 by the astronomer Ko-Show-

King from designs by the Persian astronomer Gemal-ed-din, and they are of considerable interest, being the earliest known equatorials. It is curious that Marco Polo never mentioned them, though he was at Peking when they were erected; but excellent pictures of them are given in Yule's "Book of Ser Marco Polo," third edition, vol. i., pp. 448 *sqq.*

The *Morning Post* of October 7 contains the interesting announcement that next Saturday, October 16, a memorial tablet to Descartes is to be unveiled at Amsterdam. The tablet has been placed on No. 6 Westermarkt, the house where Descartes resided during the summer of 1634. Prior to the unveiling there will be a gathering at the University, at which M. René Doumie, director of the *Revue des Deux Mondes,* and Prof. Cohen, formerly of Amsterdam University, will speak. Descartes, who was born in 1596, came of a well-to-do family of Touraine, and was always in easy circumstances. Educated by the Jesuits, then the rising schoolmasters of Europe, he afterwards continued his mathematical studies with Mersenne and Mydorge. At the age of twenty he adopted the military profession, and saw active service with the Bavarian Army during the early part of the Thirty Years' War. The first ideas of his philosophy and of his analytical geometry are said to have come to him in three dreams on the night of November 10, 1619, when bivouacked at Neuberg, on the Danube. Descartes resigned his commission in the spring of 1621, spent the next few years in study and travel, and in 1629 settled in Holland, where he found the freedom from distraction necessary to the production of his great works. Twenty years later he accepted the invitation of Queen Christina to take up his residence in Sweden. The Queen wished to found an academy with Descartes at its head, but all her designs were frustrated by his death at Stockholm on February 11, 1650. Buried first in Sweden, his remains were afterwards taken to Paris, where after several removals they now rest in the church of St. Germain-des-Prés.

Representations have on several occasions been made to the Government of the Union of South Africa, in particular by the council of the Royal Anthropological Institute, that it was urgently necessary that the study of the native population should be officially recognised and placed upon a properly constituted basis. The Government has, consequently, been much impressed by the great and urgent need for the scientific investigation of the ethnology, history and languages, customs, and religious beliefs of the Bantu race, and has now agreed to render substantial aid in the establishment of a school of Bantu life and language. Several university centres in the Union have from time to time asked for assistance to establish chairs in these subjects, but, acting on the recommendation of a Departmental Committee, the Government has decided that, for the present at any rate, it is desirable to concentrate such work. A school will, therefore, be established in connection with the University of Cape Town. A representative Committee, which includes the Secretary for Native Affairs, is now sitting to discuss the general scheme. It is anticipated that professors of Bantu ethnology and Bantu language will be appointed as a nucleus of the school at an early date.

Sir Frank W. Dyson, Astronomer Royal, has been elected an honorary member of the American Astronomical Society. Prof. Kapteyn, of Groningen, is the only other living honorary member of this society.

Unusually warm and fine weather prevailed over England during the five days from October 5 to 9. On each day the sheltered thermometer at Greenwich was 70° or above, and the highest reading was 73° on October 5. On two of the nights the minimum temperature was 57°, and on two other nights 56°. The mean maximum temperature for the five days was 71° and the mean minimum 55°, both of which were 10° above the normal. There have been slightly warmer days at Greenwich very occasionally in the early part of October, the highest temperatures recorded since 1841 being 81° on October 4, 1859, and 79° on October 4, 1886. During the last eighty years there have been only twenty-two Octobers with a temperature so high as 70°, and only two previous Octobers, 1859 and 1869, with five consecutive days of 70° or above. In recent years the warmest weather in October occurred in 1908, when the thermometer exceeded 75° on each of the first four days, but the nights were much cooler than this year. Prior to the present year the thermometer at Greenwich has only once touched 70° in October during the previous nine years.

On Thursday, October 7, at University College, London, Sir W. H. Bragg delivered a public introductory lecture on the history of science. A course of lectures on the general history and development of science was first introduced into the college curriculum last session. The course was specially required for students training for the new diploma in journalism instituted by the University of London. It was felt, however, that facilities for the study of the subject might be welcomed by a much wider circle, considering the important part played by scientific ideas and methods in the advancement of civilisation. Moreover, since the subject is obviously vast, it was deemed desirable to provide, so far as possible, courses on the history of special sciences in addition to the course on the general history of science. Accordingly, the number of lectures and lecturers for the new session has been increased considerably. A general introductory course will be given by Dr. A. Wolf; a course on the biological and medical sciences by Dr. C. Singer (first and second terms), and by Prof. W. M. Bayliss and Prof. J. P. Hill (third term); a course on Egyptian science by Prof. Flinders Petrie; a course on the history of astronomy by Prof. L. N. G. Filon; Mr. L. T. Wren will lecture on the history of mathematics (second term); and during the third term Sir W. H. Bragg, Prof. Garwood, Mr. Orson Wood, and others will deal with the more important developments of physical science during the nineteenth century. It is hoped that in due course there will be established at the college a flourishing school in the history of science in which teaching and research will both receive due attention.

Prof. F. Francis, professor of chemistry in the University of Bristol, has been elected a corresponding member of the Belgian Royal Academy of Medicine.

A Ramsay memorial fellowship of the value of 300*l.* a year for three years has been founded by subscriptions received from the Swiss Government and from Swiss donors through the good offices of Prof. Ph. A. Guye, of Geneva. The first fellow to be elected is M. Etienne Roux, of Vich (Vaud), Switzerland, who has decided to work in the laboratories of Prof. W. H. Perkin at Oxford.

Viscount Haldane, O.M., will give an address on "The Industrial Question" to members of the Institute of Industrial Administration at the Central Hall, Westminster, on Saturday, October 23, at 8 p.m. Sir Lynden Macassey will take the chair. Invitation tickets may be obtained from the hon. secretary, Mr. E. T. Elbourne, 110 Victoria Street, S.W.1.

The Thomas Vicary lecture of the Royal College of Surgeons of England will be delivered on Thursday, November 11, at 5 o'clock, by Sir D'Arcy Power, who will take as his subject "The Education of a Surgeon under Thomas Vicary." The Bradshaw lecture of the same institution will be delivered at 5 o'clock on Monday, December 6, by Sir Berkeley Moynihan. The subject will be "The Surgery of the Diseases of the Spleen."

The annual May lecture of the Institute of Metals for 1921 is to be delivered on May 4 next by Prof. T. Turner. The annual general meeting of the institute is to take place on March 9 and 10, 1921, at the Institution of Mechanical Engineers. The May lecture will be given in the same hall. An interesting programme of lectures in connection with the local sections of the institute at Birmingham, Glasgow, and Sheffield has been prepared. Among the lecturers are Lord Weir of Eastwood, Dr. W. Rosenhain, and Prof. C. H. Desch.

With reference to the letter which appeared in Nature for August 5 last, p. 709, on the loss of fragrance in musk plants, it is interesting to note that Mrs. W. H. Cope, joint secretary of the Birmingham Field Naturalists' Club, has observed a similar absence of perfume from all the musk plants which she purchased in the open flower market this year. The observation was corroborated by other members of the club, and a suggestion was made that the loss of odour was due to the atrophy of scent-producing cells consequent on a change in the type of insects by which fertilisation was effected.

The Rev. S. Claude Tickell informs us that a movement is being promoted at Santa Barbara, California, whereby all egg-collectors are invited to accumulate local eggs, with a view to world-wide exchange with other collectors. We agree with Mr. Tickell that the movement is crude and cruel, and that "recollection" by drawing should be substituted for "collection" and the consequent molestation of wild birds. For this purpose Mr. Tickell advocates the establishment of complete, permanent collections of birds' eggs in the museums of the larger towns so that children might have opportunities of drawing and memorising the eggs; this might do away with the thousands of incomplete and transitory collections which exist at the present time.

It is a very charming and modest account of Winchester College Museum that the Rev. S. A. McDowall contributes to the October issue of the *Museums Journal*. We do not gather from it how much use is made even of the Greek and Roman collections in actual school work, but that the boys out of school-hours are encouraged to take part in curatorial activities appears from the statement that "a collection of local spiders owes its existence to the keenness of a boy still in the school." By leading boys on in this way to take the first steps in research, school museums and school natural history societies may do more than professed classes. Two excellent photographs of the interior of the museum, by a boy in the school, are reproduced as one of the plates. Among much else that is of interest in the varied contents we note a discussion by Mr. E. E. Lowe of the Public Libraries Act of 1919 and its effect on the future policy of (municipal) museums.

In the *Geographical Review* for April–June (vol. ix., No. 4) Dr. V. E. Shelford has a long article, well annotated with bibliographical references, on the aquatic biological resources of the United States. While much attention has been given to water-supply for domestic purposes, to water-power, and to the disposal of sewage, Dr. Shelford points out that other aspects of aquatic resources are more or less neglected. These include, in addition to marine fisheries, freshwater fisheries and mussels, the provision of fish-ways in rivers, the breeding of edible frogs and turtles in swamps and lake-margins, the preservation of insect-destroying birds, and the cultivation of certain aquatic plants of economic value. Dr. Shelford further makes a special plea for the preservation of large swamp areas unless their presence can be shown to be actively detrimental to health. The pollution of rivers and coastal waters is condemned as harmful to natural resources.

The Congo Expedition of the American Museum of Natural History is the subject of a short article, accompanied by a map, in the Bulletin of the museum (vol. xxxix., p. xv.). The expedition, which spent more than six years in the Congo, returned to New York in 1915 with some 20,000 vertebrate and more than 100,000 invertebrate zoological specimens, besides large collections in anthropology and botany. The district explored was in the north-east of the Belgian Congo, from the Aruwimi River to the headwaters of the Welle River. The leader of the expedition was Mr. H. Lang, who was assisted by Mr. J. P. Chapin. It is proposed to publish the results in four series: scientific papers, which will be collected into twelve volumes after appearance in the Bulletin; special memoirs; three ethnological albums; and the narrative of the expedition. As some acknowledgment of the generous co-operation of the Belgian Government in the work of the expedition, it has been decided to present a duplicate set of the collection to the Congo Museum at Tervueren, near Brussels.

The hall illustrating the "Age of Man" in the American Museum of Natural History, New York, is now approaching completion, and Prof. H. F. Osborn gives some account of it in the journal of the museum, *Natural History* (vol. xx., No. 3). Besides the collection of plaster casts and specimens, there are beautiful wall-paintings by Mr. C. R. Knight, representing scenes in the life of the various races of prehistoric man and of the large mammals by which they were surrounded in different parts of the world. There are also hypothetical bust-restorations of Pithecanthropus, Eoanthropus, Neanderthal man, and Crô-Magnon man; while a completely restored figure of Neanderthal man is now being attempted. Critics may be disposed to think that existing evidence is too slender to justify some of the conclusions about man's ancestry which the exhibition suggests, but there can be no doubt that so attractive a presentation of the subject will stimulate wide interest in it in America.

We have recently received vol. xvii., part v., of the Annals of the South African Museum, containing two systematic papers, one on the Crustacea, the other on the spiders, of South Africa. The former is the sixth contribution by Mr. K. H. Barnard on the crustacean fauna of South Africa, and deals with further additions to the list of marine Isopoda; 73 species are here recorded, 45 being described as new. The list of South African marine Isopoda now includes about 170 species.

In his presidential address to the Eugenics Association of America (*Scientific Monthly*, September) Dr. Stewart Paton pleads for a more definite and exact knowledge of man in order that the study of eugenics may be directed on sound lines, and especially points out the importance of the study of the personality—the reactions of the human machine as a whole to the conditions actually met with in life. A body of investigators specially trained in the difficult art of studying the personality—which cannot be judged only from the point of view of the physiologist or psychologist—is essential for future progress.

Miss E. A. Fraser has investigated the pronephros and the early development of the mesonephros in the cat (*Journal of Anatomy*, vol. liv., part iv., July, 1920), and finds that the embryonic excretory system of this animal is one continuous organ, the degenerate anterior end passing posteriorly into the fully developed mesonephros. A pronephric ridge is developed as a thickening of the somatic wall of the intermediate cell-mass. During the formation of this ridge and immediately lateral to it a series of cœlomic chambers becomes cut off from the general body-cavity, each chamber communicating with the body-cavity by a narrow passage. Such chambers do not appear to have been observed previously in a mammal, and it is suggested that they represent vestigial pronephric chambers, each with a peritoneal funnel. They soon undergo a change, and from the region of the eleventh somite backwards they close off from the body-cavity and form an almost solid longitudinal cord, which later becomes divided into a series of vesicles, the central cavity of each of which arises secondarily. Though it is difficult to demonstrate that the longitudinal cord of tissue in which the vesicles arise is actually derived from the pronephric chambers, this interpretation seems to be the correct one. If so, then the pronephric chambers are homologous with the Malpighian capsules.

During the course of recent ecological work on the Irish coast—near Dublin and in Galway Bay—collections were made of the mites (Acarina) occurring in the inter-tidal area, and Mr. J. N. Halbert has described the material in a paper published in the Proceedings of the Royal Irish Academy (vol. xxxv., B7, 1920). The species dealt with, which are such as can be reasonably considered as habitual denizens of the inter-tidal area, do not apparently exhibit any striking modifications to suit them for a semi-aquatic life, *e.g.* the breathing organs present no modification. The majority of the species possess, in common with many purely terrestrial species, a smooth, shining epidermis or a covering of hairs, which serves to protect the surface of the mite from becoming wetted. The usual habitat of these mites is in sheltered places—crevices, rock-fissures, and under embedded stones—such as have been for long undisturbed, and where air is imprisoned during high tides. Higher up on the shore, at about high-water mark, a few species have succeeded in establishing themselves where they are only occasionally wetted or sprayed. The zonal distribution of the inter-tidal mites is shown in a table, from which it is seen that below the upper zone, named the orange lichen zone (from the occurrence there of Physcia, Lecanora, etc.), the number of species becomes suddenly much less. The list contains seventy-seven species, twelve of which are new, and a new genus is described.

Cloudiness in the United States is the subject of an article by Prof. R. De C. Ward in the *Geographical Review* for April–June (vol. ix., No. 4, 1920). The article contains a useful bibliography of the subject and a new map showing the mean annual cloudiness. The regions of maximum cloudiness appear to be the Great Lakes and the St. Lawrence valley in the east and the northern part of the Pacific Coast in the west. The desert regions in the south-west naturally experience least cloud. Over most of the country the difference between the amount of cloud in the cloudiest and in the least cloudy months is only 10–20 per cent., but in the regions of maximum cloudiness it is 30 per cent. or more, and in the western plateau region it is more than 40 per cent.

The microscopic examination of the structure of metals and other substances by the aid of light reflected from a polished and etched surface has proved of such great value that Mr. F. E. Wright, of the Geophysical Laboratory of the Carnegie Institution, Washington, has gone carefully into the question as to how far it might be possible by such an examination in polarised light to determine the optical constants of the materials present in the surface. The result of his work is published in No. 7 of the Proceedings of the American Philosophical Society for the current year. Unfortunately, Mr. Wright finds that these constants cannot be satisfactorily found by the method, although there is no difficulty in ascertaining whether the substances seen are crystalline or not by the rotation of the plane of polarisation of plane polarised incident light. Tests of colour, hardness, and behaviour under the action of solvents still remain the most trustworthy for the determination of the substances exposed at the surface.

AMONG the announcements of forthcoming books just issued by the Oxford University Press is one which should appeal especially to readers of NATURE, viz. vol. ii. of "Studies in the History and Method of Science," edited by Dr. C. Singer. The work will contain the following contributions:—Greek Biology and its Relation to the Rise of Modern Biology, Dr. C. Singer; Medieval Astronomy, Dr. J. L. E. Dreyer; Leonardo as Anatomist, H. Hopstock; Science and Hypothesis, Dr. F. C. S. Schiller; The Asclepiadæ and the Priests of Asclepius, E. T. Withington; History of Anatomical Injections, F. J. Cole; The Scientific Works of Galileo, J. J. Fahie; Unity in Modern Scientific Thought, F. S. Marvin; Four Armenian Tracts on the Structure of the Human Body, F. C. Conybeare; Roger Bacon and the State of Science in the Thirteenth Century, R. Steele; A History of Palæobotany, Dr. E. N. A. Arber; Science and Metaphysics, J. W. Jenkinson; and Archimedes' Principle of the Balance and some Criticisms upon it, J. M. Child. The same publishers also promise "A History of Greek Mathematics," by Sir Thomas Heath, in two volumes.

SIR ISAAC PITMAN AND SONS, LTD., have in preparation a new series of Technical Primers, the aim of which is to present a sound technical survey of fundamental facts, principles, equipment, and practice in volumes covering ultimately all phases and branches of technology. The earliest volumes will deal with Continuous-Current Armature Winding, Belts for Power Transmission, Municipal Engineering, Water-Power Engineering, Photographic Technique, Foundrywork, Pattern-Making, Hydro-Electric Developments, The Electric Furnace, Small Single-Phase Transformers, Pneumatic Conveying, The Electrification of Railways, and The Steam Locomotive.

THE Cambridge Pocket Diary for the academic year 1920–21 has been issued by the Cambridge University Press, price 3*s*. In addition to the information usually found in diaries, a complete list of University officials, dates of examinations and of meetings of officials, and local information, such as Cambridge telephone numbers and the train service to London and to Oxford, are included in this convenient little book.

THE United States Coast and Geodetic Survey has published a short list (No. 109) of its publications since January 1, 1914, which is supplied free of charge to those interested. The list includes papers in geodesy, magnetism, cartography, and hydrography.

Our Astronomical Column.

THE ITALIAN ASTRONOMICAL SOCIETY.—This society is commencing the publication of the third series of its Memoirs. Vol. i., No. 1, has just appeared, and contains several papers of interest. The Rev. J. G. Hagen writes on the galaxy and the "Via Nubila"—a name that he suggests for a stream of nebulæ, both luminous and dark, having its maximum density in the well-known nebulous region round the galactic North Pole. G. Armellini contributes a paper on the gravitational potential of the galaxy, and endeavours to explain certain small anomalies in the motion of the planets Saturn and Neptune by stellar perturbations. It is, however, fairly clear that on any reasonable assumption of the mass of the stellar system its differential action within the planetary family must be wholly inappreciable. A. Bemporad publishes a series of comparisons of 32 Geminorum with the neighbouring stars ξ and *e* Geminorum, made with a wedge photometer between December and March last. It is concluded that the magnitude of 32 Geminorum varies between 6·5 and 7·2 in a period of 2·43 days; the light-curve is not given, but it is stated to be "of the usual type of short-period variables, with a pronounced secondary maximum." E. Bianchi notes that the minor planet (44) Nysa varied in light with a range of half a magnitude in a period of thirty-six days; these observations were made in March and April, 1913. On the other hand, observations in 1920 indicate the much shorter period of 3¼ hours; this is presumably an effect of rotation, in which case the monthly variation previously observed needs some other explanation. Other papers deal with the giant and dwarf stars (G. Zappa); measures of the sun's diameter, which appear to show some variation in the value in the course of the sun-spot cycle (A. Prosperi); and stellar spectra with an objective prism (G Abetti).

THE COLOUR OF NEBULOUS STARS.—Sir W. Herschel discovered 130 years ago that certain stars were surrounded by nebulous envelopes, and made the correct deduction that the latter were gaseous, not stellar. These objects play an important part in theories of cosmogony, and deserve careful study. The *Astrophysical Journal* for July contains a paper by F. H. Seares and E. P. Hubble which establishes the interesting fact that these stars are redder by about one colour-class than would be expected from their spectral type. This was first noted visually by Hubble in one or two cases; a systematic campaign was therefore planned with the Mount Wilson 60-in. reflector, using the method of exposure ratios. About fifty stars were examined, being roughly half of the known objects of this type. Their spectra are mainly of type B, with a few early A's, one Oe5, and one G5. Check stars were photographed at the same altitude to determine the plate constants. The stars mainly lie in two groups, and the mean excess of colour-class for these groups is 1·28 and 0·88. In a few cases where the effect does not appear it is stated that the visual aspect suggests that the star is not really in the nebula, but accidentally projected upon it.

There is a discussion of possible explanations; the most straightforward is that the red colour is produced by molecular scattering in the nebulous envelope. Fluorescence in the nebula near the star's surface is also suggested; alternatively, that the presence of the envelope may have an influence on the star's constitution. It is noted that if the envelope were composed of particles above a certain size, general, and not differential, absorption would result, so that this may explain the non-occurrence of the phenomenon in a few cases.